

## DBDI® Splice System

### IAPMO Evaluation Report ER-0321

The Dayton Superior DBDI Splice System is a two-piece, standard mechanical splicing product that eliminates protruding dowels. Typical applications include splicing reinforcement bars in monolithic structures, rebar anchorages, future expansion, and dowel bar substitution at construction joints.

The components of the system, the Dowel Bar (DB) and Dowel-In (DI), are manufactured from standard rebar material. Basic fabrication consists of forging and threading operations. No welding or machining is required and the threading operation does not reduce the nominal cross-sectional area of the bar. The completed splice obtains ultimate bar strengths and meets or exceeds all existing code requirements.

### System Advantages

The patented DBDI Splice System has been engineered, tested, and proven to meet or exceed all field standards and design/engineering practices. The system is easy to use and readily identified as rebar material. The easy installation requires no special tools or machinery and simplifies the forming operations. There are no “extras,” such as wedges, nuts, collars or couplers required and routine cutting, bending, etc., can be easily handled in the field, if required.

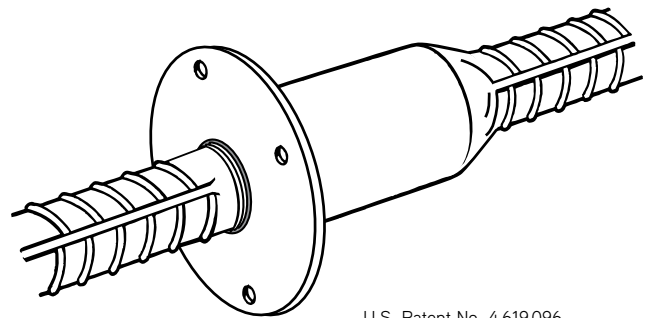
### The Dayton Superior DBDI Splice System Advantages:

- Strong
- Safe
- Easy to Use
- Eliminates Protruding Dowels
- Improves Forming Costs
- Reduces Forming and Stripping Hassles
- Saves Forms By Eliminating Drilling Holes
- No Forming Required

### System Compliance

The DBDI Splice System complies with the following standards/ specifications:

- ACI 318 Type 2
- IAPMO Evaluation Report ER-0321
- State Departments of Transportation
- Ministries of Transportation (Canada)
- Caltrans Ultimate Splice
- City of Los Angeles Department of Building and Safety
- Army Corps of Engineers CW03210
- AASHTO
- International Building Code (IBC)



U.S. Patent No. 4,619,096

### Typical Splicing Specification

The Dayton Superior DBDI Splice System, consisting of the Dowel Bar and Dowel-In, shall be used in splicing of rebar. The DBDI System shall be forged from deformed rebar material, free of external welding and machining. It shall be furnished with an integral nailing flange and threaded with UNC or UN thread to a depth, at minimum, equal to the nominal thread diameter. The Dowel-In shall be fabricated from deformed rebar material with thread corresponding to the Splicer. The completed splice shall meet Type 2 tensile requirements of American Concrete Institute Specification 318, Building Code Requirements for Reinforced Concrete and the Corps of Engineers Specification CW03210, Civil Works Construction Guide Specification for Steel Bars, Welded Steel Wire Fabric and Accessories for Concrete Reinforcement.

### Specific:

- Mechanical connections shall be the DBDI® Splice System as manufactured by Dayton Superior Corporation.

### Generic:

- The mechanical connection shall meet building code requirements of developing in tension and compression as required by \_\_\_\_\_ (insert name here). The mechanical connection shall be the forged and parallel threaded type coupler manufactured from high quality steel. All couplers shall be installed per the manufacturer’s approved procedures.

## Recommended Dowel Bar and Dowel-In Sizes

Specified or Required Dowel Bar					Recommended Dowel Bar Splicer and Dowel-In						
Bar Size			Grade 60 Rebar Loads (lbs.)		System Thread Size*	DB-SAE Bar Size	Dowel-In Bar Size	System Stress Area (min.)	Completed Splice (lbs.)		
US	Metric (mm)	CN (M)	$P_y$	$1.25 P_y$					$P_y$	$1.25 P_y$	$100\% P_u$
#4	[13]	[10]	12,000	15,000	5/8" - 11	#4	#4	.20	12,000	15,000	18,000
#5	[16]	[15]	18,600	23,250	3/4" - 10	#5	#5	.31	18,600	23,250	27,900
#6	[19]	[20]	26,400	33,000	7/8" - 9	#6	#6	.44	26,400	33,000	39,600
#7	[22]	—	36,000	45,000	1" - 8	#7	#7	.60	36,000	45,000	54,000
#8	[25]	[25]	47,400	59,250	1-1/8" - 8	#8	#8	.79	47,400	59,250	71,100
#9	[29]	[30]	60,000	75,000	1-1/4" - 8	#9	#9	1.00	60,000	75,000	90,000
#10	[32]	—	76,200	95,250	1-7/16" - 8	#10	#10	1.27	76,200	95,250	114,000
#11	[36]	[35]	93,600	117,000	1-9/16" - 8	#11	#11	1.56	93,600	117,000	140,400

$P_y$  = Minimum Yield Strength of bar.

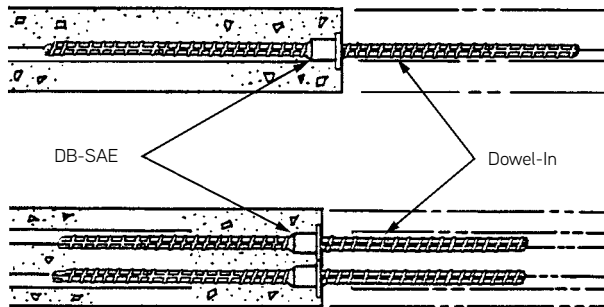
$P_u$  = Minimum Tensile Strength of bar.

\*5/8", 3/4", 7/8" and 1" sizes have UNC Threads. 1-1/8" and larger sizes are equipped with UN Threads.

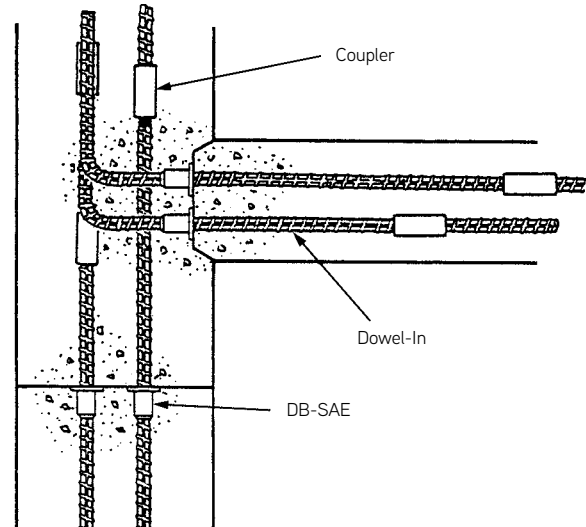
## REQUIRED DEVELOPMENT AND LAP LENGTHS FOR GRADE 60, UNCOATED BOTTOM REINFORCEMENT IN NORMAL WEIGHT CONCRETE

### TYPICAL THREADED SPLICING APPLICATIONS

Application	$f'_c$ psi	#6 and Smaller Bars	#7 and Larger Bars
Clear spacing of bars being developed or spliced not less than $d_b$ , clear cover not less than $d_b$ , and beam stirrups or column ties throughout $d$ not less than the code minimum or Clear spacing of bars being developed or spliced not less than $2d_b$ and clear cover not less than $d_b$	3,000	44 $d_b$	55 $d_b$
	4,000	38 $d_b$	47 $d_b$
	5,000	34 $d_b$	42 $d_b$
	6,000	31 $d_b$	39 $d_b$
	8,000	27 $d_b$	34 $d_b$
	10,000	24 $d_b$	30 $d_b$
Other cases	3,000	66 $d_b$	82 $d_b$
	4,000	57 $d_b$	71 $d_b$
	5,000	51 $d_b$	64 $d_b$
	6,000	46 $d_b$	58 $d_b$
	8,000	40 $d_b$	50 $d_b$
	10,000	36 $d_b$	44 $d_b$



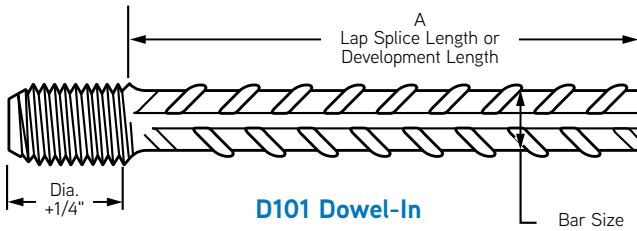
Typical Dowel Bar Splicer/Dowel-In Applications



## DBDI Splice System

### D101 Dowel-In, D102 90° Hooked Dowel-In, D103 180° Hooked Dowel-In, D104 Double-Ended Dowel-In

The Dayton Superior Dowel-In is available Straight (D101), 90° and 180° Hooked (D102 and D103) and Double-Ended (D104). Each is manufactured from deformed rebar material and is available in rebar sizes #4 through #11. The threaded end of the Dowel-In is enlarged by forging, before threading, to ensure that the cross-sectional area of the bar is not reduced by the threading operation. This design feature assures full ultimate strength of the rebar. Dowel-Ins are configured to facilitate easy installation and can be easily assembled by hand. On larger projects, such as highway paving, a centrifugal chuck on an electric or air-powered drill motor can be employed to speed installation. See D49 Magna Jaw.



#### To Order:

Specify: (1) quantity, (2) name, (3) bar size (should be equivalent to the rebar being substituted for on the structural drawings), (4) dimensions required (see below).

#### Example:

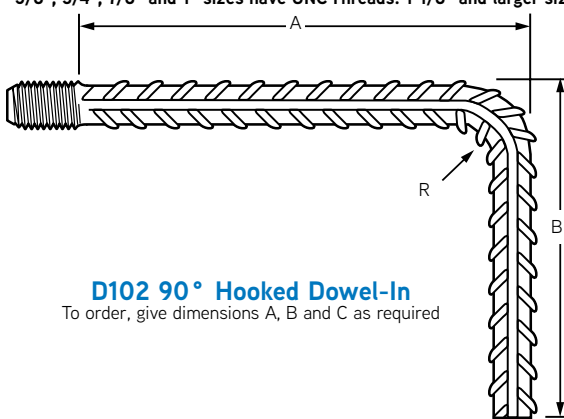
600, D102 90° Hooked Dowel-Ins, #5 rebar, A=14", B=8"

Specified or Required Dowel Bar					Recommended Dowel Bar and Dowel-In							
Bar Size			Grade 60 Rebar Loads (lbs.)		System Thread Size*	DB-SAE Bar Size	Dowel-In Bar Size	System Stress Area (min.)	Completed Splice (lbs.)			
US	Metric (mm)	CN (M)	P <sub>y</sub>	1.25 P <sub>y</sub>					P <sub>y</sub>	1.25 P <sub>y</sub>	100% P <sub>ult</sub>	
#4	[13]	[10]	12,000	15,000	5/8" - 11	#4	#4	.20	12,000	15,000	18,000	
#5	[16]	[15]	18,600	23,250	3/4" - 10	#5	#5	.31	18,600	23,250	27,900	
#6	[19]	[20]	26,400	33,000	7/8" - 9	#6	#6	.44	26,400	33,000	39,600	
#7	[22]	—	36,000	45,000	1" - 8	#7	#7	.60	36,000	45,000	54,000	
#8	[25]	[25]	47,400	59,250	1-1/8" - 8	#8	#8	.79	47,400	59,250	71,100	
#9	[29]	[30]	60,000	75,000	1-1/4" - 8	#9	#9	1.00	60,000	75,000	90,000	
#10	[32]	—	76,200	95,250	1-7/16" - 8	#10	#10	1.27	76,200	95,250	114,000	
#11	[36]	[35]	93,600	117,000	1-9/16" - 8	#11	#11	1.56	93,600	117,000	140,400	

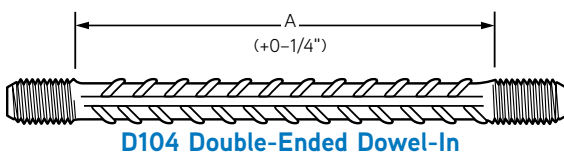
P<sub>y</sub>=Minimum Yield Strength of bar.

P<sub>u</sub>=Minimum Tensile Strength of bar.

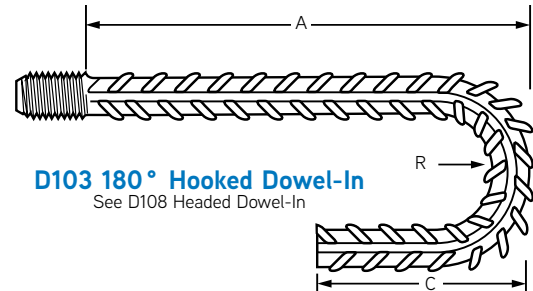
\*5/8", 3/4", 7/8" and 1" sizes have UNC Threads. 1-1/8" and larger sizes are equipped with UN Threads.



**D102 90° Hooked Dowel-In**  
To order, give dimensions A, B and C as required



**D104 Double-Ended Dowel-In**



**D103 180° Hooked Dowel-In**

See D108 Headed Dowel-In

Bar Size Designation			D101 Minimum Mfg. Length DI DOWEL INS	D102/D103 Minimum Mfg. Length	D104 Minimum Length Double End Dowel Ins.
US	Metric (mm)	CN (M)			
#4	[13]	[10]	9"	4" *	8" **
#5	[16]	[15]	9"	5" *	8" **
#6	[19]	[20]	9-1/4"	6" *	8" **
#7	[22]	—	9-1/4"	7" *	8" **
#8	[25]	[25]	15-1/2"	8" *	14" **
#9	[29]	[30]	15-1/2"	9" *	14" **
#10	[32]	—	15-3/4"	10" *	14" **
#11	[36]	[35]	16"	11" *	14" **

NOTE: To be manufactured as Single End

\* Tolerance on Bending Plus 0/ Minus 1" on "A" Dim.

\*\* Plus thread each end.

## DBDI Splice System

### D101A Dowel Bar, D102A 90° Hooked Dowel Bar, D103A 180° Hooked Dowel Bar, D104A Double-Ended Dowel Bar

The Dayton Superior Dowel Bar is a one-piece unit, integrally forged from deformed rebar material. The splicers are available in #4 through #11 rebar sizes to be used in conjunction with the corresponding size Dowel-In to accomplish a mechanical splice designed to achieve full mechanical ultimate.

The splicer can be furnished straight (D101A) cut to length, 90° and 180° hooked (D102A and D103A) and double-ended (D104A). The splicer can also be special-ordered with a reduced diameter washer flange or with the washer flange clipped (in more than one direction, if required) to provide adequate concrete cover, or to avoid interference.

The D104A Double-Ended Dowel Bar is used to establish a direct load path through a concrete section, thus avoiding multiple hooked rebar and eliminating rebar congestion. The double-ended unit can be configured in a "U" shape for special applications.

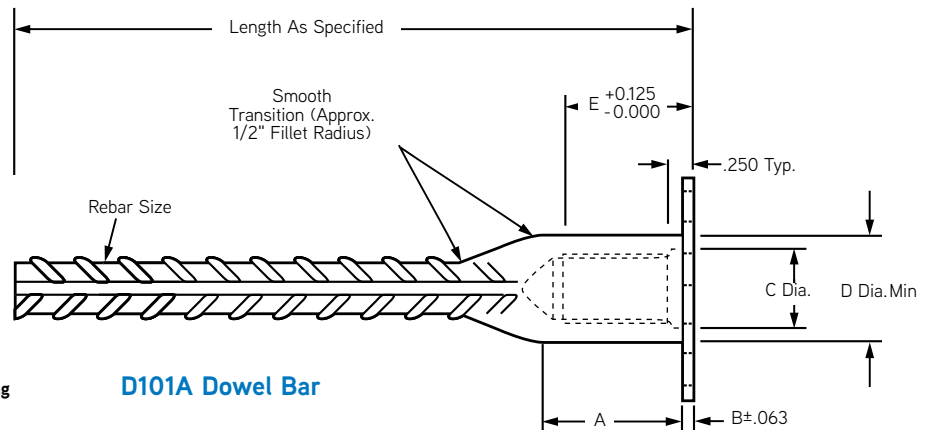
Bar Size Designation			Thread Size	A	B	C	D	E	Flange Diameter	100% P <sub>u</sub>
US	Metric (mm)	CN (M)								
#4	[13]	[10]	5/8" – 11 UNC	1-1/16"	1/8"	11/16"	55/64"	1"	1-7/8"	18,000
#5	[16]	[15]	3/4" – 10 UNC	1-9/16"	1/8"	13/16"	1-3/64"	1-1/8"	2-1/16"	27,900
#6	[19]	[20]	7/8" – 9 UNC	1-11/16"	1/8"	15/16"	1-15/64"	1-1/4"	2-1/4"	39,600
#7	[22]	—	1" – 8 UNC	1-27/32"	1/8"	1-1/16"	1-27/64"	1-3/8"	2-7/16"	54,000
#8	[25]	[25]	1-1/8" – 8 UN	2-1/16"	1/8"	1-3/16"	1-19/32"	1-1/2"	2-5/8"	71,100
#9	[29]	[30]	1-1/4" – 8 UN	2-3/16"	1/8"	1-5/16"	1-25/32"	1-5/8"	2-13/16"	90,000
#10	[32]	—	1-7/16" – 8 UN	2-7/16"	1/8"	1-1/2"	2"	1-13/16"	3"	114,000
#11	[36]	[35]	1-9/16" – 8 UN	2-9/16"	1/8"	1-5/8"	2-7/32"	1-15/16"	3-1/4"	140,400

P<sub>u</sub> = Minimum Tensile Strength of bar.

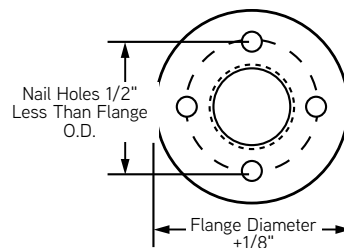
Bar Size Designation			D101A
US	Metric (mm)	CN (M)	Minimum MFG. Length DB-SAE
#4	[13]	[10]	12"
#5	[16]	[15]	14"
#6	[19]	[20]	16"
#7	[22]	—	16"
#8	[25]	[25]	16"
#9	[29]	[30]	16"
#10	[32]	—	16"
#11	[36]	[35]	16"

NOTE: To be manufactured as Single End

NOTE: No. 4, 5 and 6 splicers, 18", 24" and 36" long will usually have a stamped metal plug to protect threads; all other sizes will have a plastic cap plug.



D101A Dowel Bar



Optional Clipped Flange

## Recommended Dowel Bar and Dowel-In Sizes

Specified or Required Dowel Bar					Recommended Dowel Bar Splicer and Dowel-In							
Bar Size			Grade 60 Rebar Loads (lbs.)		System Thread Size*	DB-SAE Bar Size	Dowel-In Bar Size	System Stress Area (min.)	Completed Splice (lbs.)			
US	Metric (mm)	CN (M)	$P_y$	$1.25 P_y$					$P_y$	$1.25 P_y$	$100\% P_u$	
#4	[13]	[10]	12,000	15,000	5/8" - 11	#4	#4	.20	12,000	15,000	18,000	
#5	[16]	[15]	18,600	23,250	3/4" - 10	#5	#5	.31	18,600	23,250	27,900	
#6	[19]	[20]	26,400	33,000	7/8" - 9	#6	#6	.44	26,400	33,000	39,600	
#7	[22]	—	36,000	45,000	1" - 8	#7	#7	.60	36,000	45,000	54,000	
#8	[25]	[25]	47,400	59,250	1-1/8" - 8	#8	#8	.79	47,400	59,250	71,100	
#9	[29]	[30]	60,000	75,000	1-1/4" - 8	#9	#9	1.00	60,000	75,000	90,000	
#10	[32]	—	76,200	95,250	1-7/16" - 8	#10	#10	1.27	76,200	95,250	114,000	
#11	[36]	[35]	93,600	117,000	1-9/16" - 8	#11	#11	1.56	93,600	117,000	140,400	

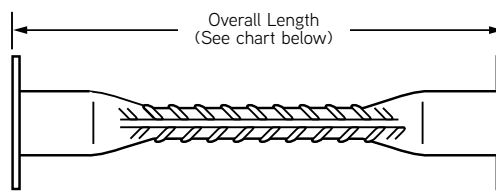
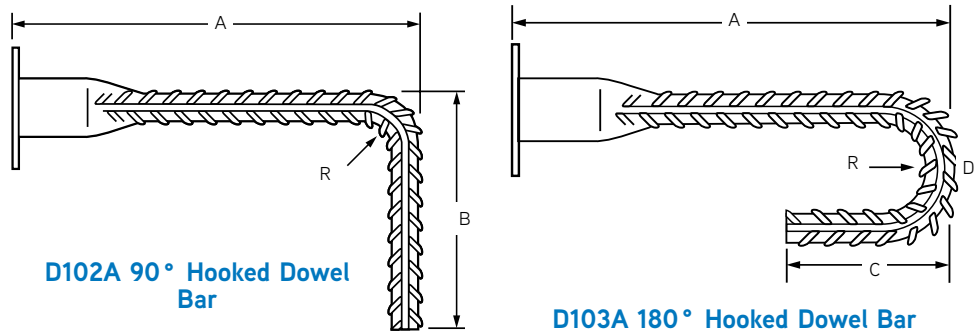
$P_y$  = Minimum Yield Strength of bar.

$P_u$  = Minimum Tensile Strength of bar.

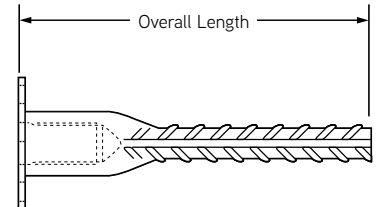
\*5/8", 3/4", 7/8" and 1" sizes have UNC Threads. 1-1/8" and larger sizes are equipped with UN Threads.

Bar Size Designation			Bending DB or DI 90° only Minimum "A" Dimension
US	Metric (mm)	CN (M)	
#4	[13]	[10]	4" *
#5	[16]	[15]	5" *
#6	[19]	[20]	6" *
#7	[22]	—	7" *
#8	[25]	[25]	8" *
#9	[29]	[30]	9" *
#10	[32]	—	10" *
#11	[36]	[35]	11" *

\* Tolerance on Bending Plus 0 / Minus 1" on "A" Dimension



D104A Double-Ended Dowel Bar



D101A Dowel Bar

Bar Size Designation			D104A Double-Ended Min. Lengths	Tolerance Overall Length
US	Metric (mm)	CN (M)		
#4	[13]	[10]	12" O.A.	+0 - 3/8"
#5	[16]	[15]	12" O.A.	+0 - 3/8"
#6	[19]	[20]	14" O.A.	+0 - 1/2"
#7	[22]	—	16" O.A.	+0 - 5/8"
#8	[25]	[25]	16" O.A.	+0 - 3/4"
#9	[29]	[30]	16" O.A.	+0 - 1"
#10	[32]	—	16" O.A.	+0 - 1"
#11	[36]	[35]	16" O.A.	+0 - 1"

\*\* Based on barrels forged on each end. For lengths less than minimum, please check with manufacturing facility. We may supply forged DB one end, DI with Coupler and nailer washer other end.

See D108 Headed Dowel Bar.

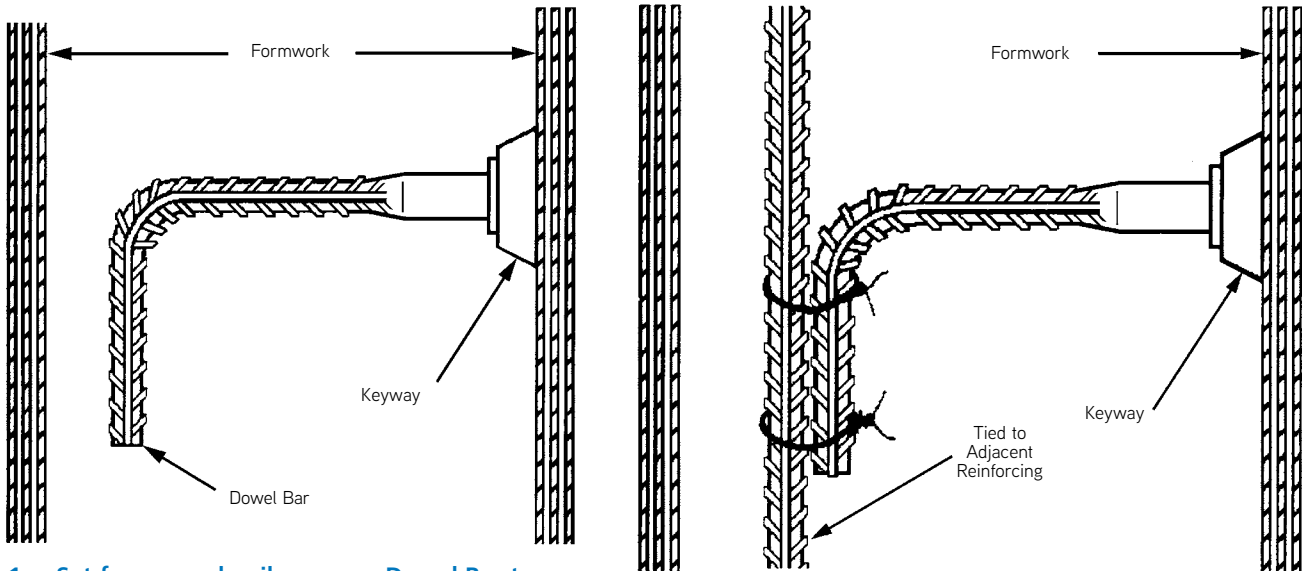
### To Order:

Specify: (1) quantity, (2) name, (3) bar size (should be equivalent to the rebar being substituted for on the structural drawings), (4) dimensions required.

### Example:

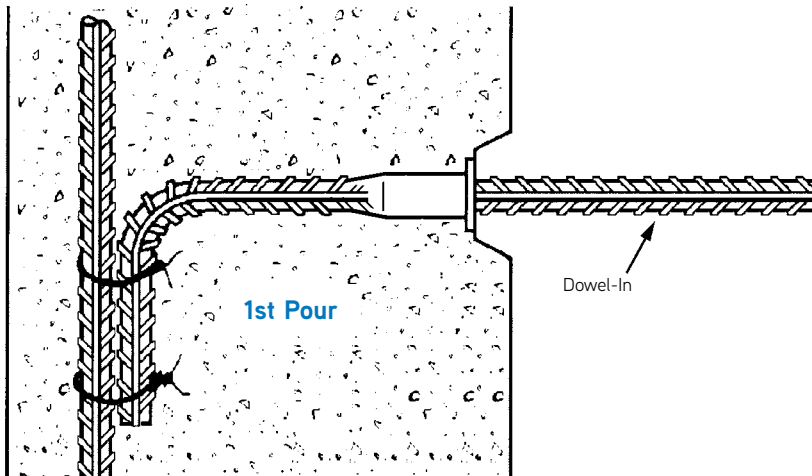
600, D101A Dowel Bars, #5 rebar, 36" long.

**Typical DBDI Installation**

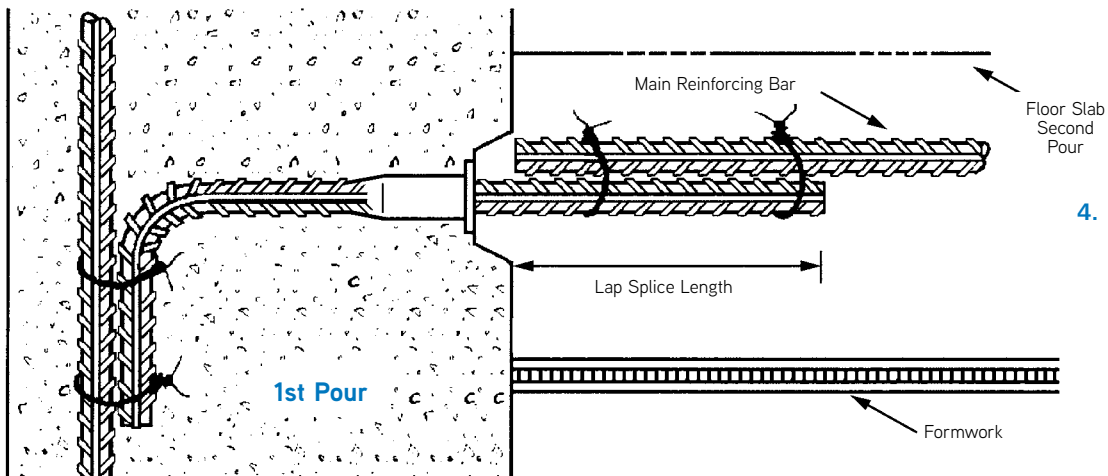


1. Set forms, and nail or screw Dowel Bar to form key.

2. Place required reinforcing steel.



3. After first pour has properly set, remove the formwork and screw Dowel-Ins into the exposed Dowel Bars.



4. Place second pour formwork and reinforcing steel.

## D106 DBDI Weldable Coupler

### Product Description:

The D106 Weldable Couplers provide a convenient means of connecting reinforcing bars to structural steel plates or sections. Shorter than the standard coupler, it is threaded at one end. The other end is welded directly to the steel.

The couplers are produced in ASTM A108 C 1018

The D108 DBDI Weldable Coupler is suitable for welding to structural steels. The load conditions at the connection must be determined by the engineer along with the type and size of weld required. Another important consideration is the type of electrode to be used, which must be matched to the properties of the plate and tube, and to the site conditions under which the welding will be undertaken. Welders should be qualified for the type of weld required.



### Product Features and Benefits:

- The compact design of the coupler ensures suitability for use in confined situations where space is restricted or where the loss of cover must be minimized
- Reduces engineering design time
- Eliminates rebar congestion
- Provides Type 2 splicing capacities and simplifies load paths
- Meets approval from IAPMO ER-0319, ACI, Caltrans, IBC, and Ministries of Transportation for Ontario and Quebec
- Approved for use in fatigue applications

### Product Specifications:

- Extension of DBDI product line
- Accommodates rebar sizes #4 through #11
- Type 2 Splice

### To Order:

Specify: (1) quantity, (2) name, (3) rebar size.

### Example:

500 pcs., D106 DBDI Weldable Coupler, #6.

### Product Codes D106DBDI Weldable Coupler

Bar Size			Black (Made in USA)	Thickness (in.)	Outer Diameter (in.)	20° Chamfer (in.)
US	Metric (MM)	CN (M)				
#4	[13]	[10]	77714	1.125	1.3	0.25
#5	[16]	[15]	77715	1.25	1.3	0.25
#6	[19]	[20]	77716	1.375	1.3	0.38
#7	[22]	—	77717	1.5	1.5	0.38
#8	[25]	[25]	77718	1.625	1.6	0.50
#9	[29]	[30]	77719	1.75	1.9	0.56
#10	[32]	—	77720	1.9375	2.3	0.63
#11	[36]	[35]	77721	2.0625	2.4	0.75